

REMARKS

Claims 1 – 28 have been examined. Claims 1 – 5, 7, 11 – 15, 17, 18, 20 – 24, 26, and 27 stand rejected under 35 U.S.C. §103(a) as unpatentable over U.S. Pat. No. 6,846,745 (“Papasouliotis '745”) in view of U.S. Pat. No. 6,596,654 (“Bayman”); Claims 6 and 8 – 10 stand rejected under 35 U.S.C. §103(a) as unpatentable over Papasouliotis '745 in view of Bayman, and further in view of U.S. Pat. No. 5,756,402 (“Jimbo”); and Claims 16, 19, 25, and 28 stand rejected under 35 U.S.C. §103(a) as unpatentable over Papasouliotis '745 in view of Bayman, and further in view of U.S. Pat. No. 6,794,290 (“Papasouliotis '290”). The rejections are respectfully traversed.

The Office Action relies on Papasouliotis '745 for most of the elements of the independent claims, acknowledging that it does not teach or suggest a flow rate of a hydrogen precursor (Office Action, p. 5). For this element, the Office Action relies on the disclosure of Bayman. But in proposing this combination, the Office Action appears not to account for the very different contexts in which these disclosures are made. Papasouliotis '745 discloses a dep/etch/dep process but Bayman is concerned only with a deposition process. The claim element reciting a flow rate for the hydrogen precursor refers to a flow rate during the etching phase of a dep/etch/dep process and is included in combination with halogen and oxygen precursors. What Bayman discloses is the use of a hydrogen precursor during a deposition process. While it is true that the hydrogen acts as a sputtering agent that removes some material during deposition, this is a general characteristic of HDP processes (*see* Application, p. 2, ll. 13 – 16). Nothing in Bayman suggests in any way the use of a hydrogen precursor during a halogen-based etching process, and certainly not in combination with the other precursors recited in the claims as being used during the etching part of the process. At best, the teachings of Bayman might suggest the use of a hydrogen precursor as a sputtering agent during the deposition phases of the Papasouliotis '745 dep/etch/dep process. But they certainly say nothing to one of skill in the art about the use of a hydrogen precursor during the etching phase of such a process.

In explaining the basis for rejection, the Office Action takes the view that the disclosure of SiH₂F₂ as a potential precursor in Papasouliotis '745 for the etching phase of the process satisfies the claim elements requiring a flow of a halogen precursor and a flow of a hydrogen precursor. Applicants have no quarrel with such a view by itself, but note that the claims separately define limits on the specific flow rates of the halogen and hydrogen precursors.

In proposing to incorporate the teachings of Bayman regarding the flow rate of the hydrogen precursor, there are two possibilities, neither of which is indicated by any teaching or suggestion in the prior art.

First, the Office Action might be suggesting that the SiH₂F₂ precursor be flowed at the 400 sccm rate taught by Bayman. But there is no basis to believe that a flow rate for H₂ in the context of the specific deposition processes taught by Bayman would be appropriate for a flow of a SiH₂F₂ precursor during an etching process, particularly when the flow of the SiH₂F₂ precursor also determines the flow of the halogen precursor.

Second, the Office Action might be suggesting that an H₂ precursor be flowed in addition to the SiH₂F₂ precursor, or perhaps in addition to one of the other fluorine precursors identified by Papasouliotis '745. But the fact that Bayman teaches the use of hydrogen as a sputtering agent during an HDP deposition process in no way suggests to one of skill in the art its suitability during a halogen etching process. A halogen etching process is a chemical process used to remove deposited material that is significantly different from the mechanical sputtering described by Bayman. The only recognition of the value of combining a halogen etch with a hydrogen flow is to be found in Applicants' disclosure, which recognizes not only the potential for diluent effects but also the potential for chemical interactions that result in a process having both isotropic and anisotropic components (see Application, p. 9, l. 19 – p. 10, l. 14).

For these reasons, Applicants respectfully disagree that the teachings of the cited references would lead one of skill in the art to the claimed invention.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 303-571-4000.

Respectfully submitted,

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